Sept. 11, 1928. 1,683,984

H. V. MOONEY ET AL

DRYING SYSTEM

Filed May 3, 1926 2 Sheets-Sheet 1

FIG. 1.

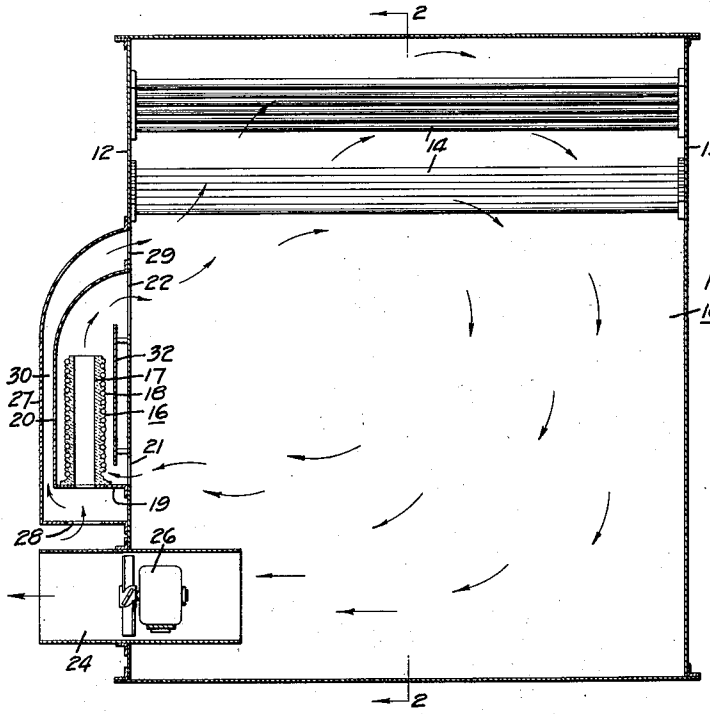
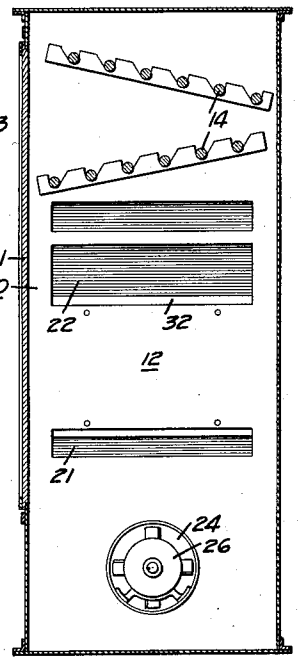


FIG. 2.



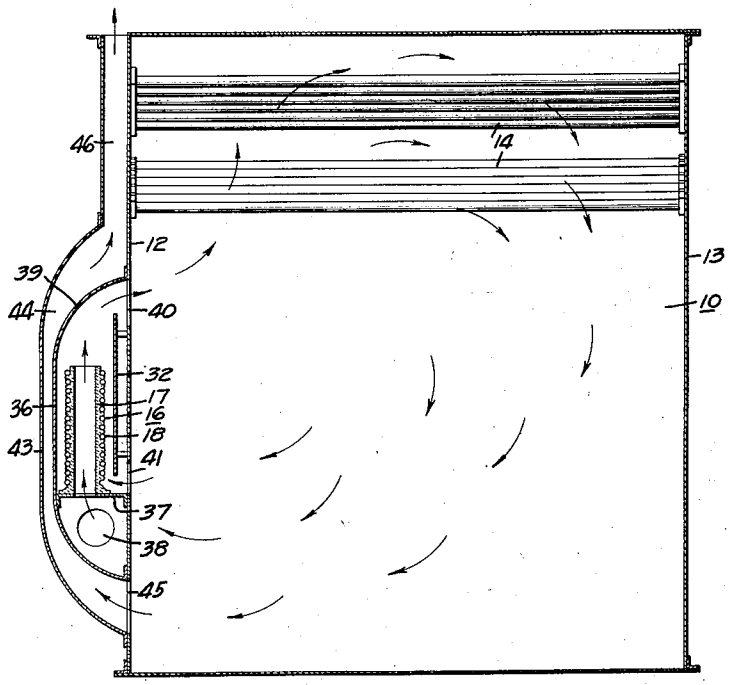


FIG. 3.

INVENTORS
Harry V. Mooney.
William W. Hicks
BY
White & Frost
ATTORNEYS

Sept. 11, 1928. 1,683,984

H. V. MOONEY ET AL

DRYING SYSTEM

Filed May 3, 1926 2 Sheets-Sheet 2

FIG. 4.

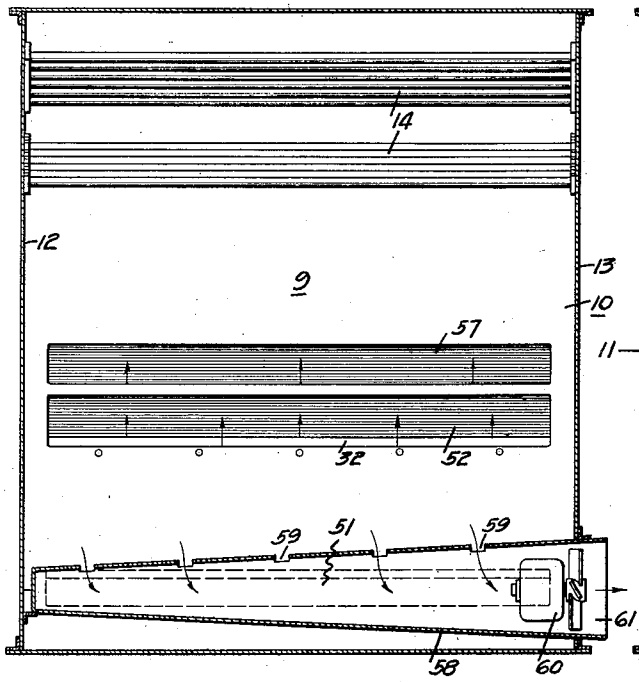


FIG. 5.

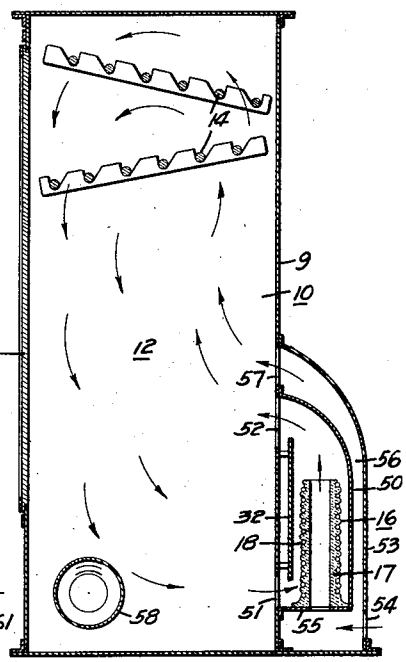
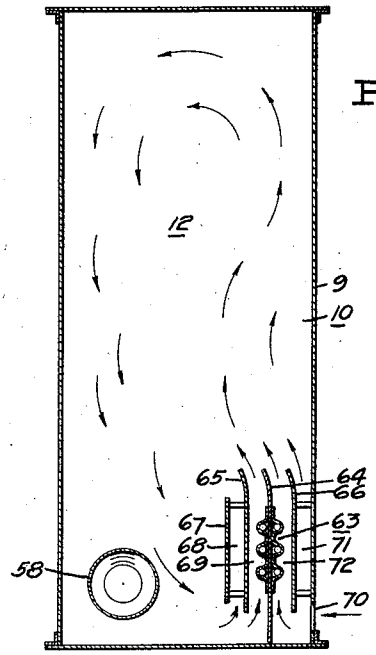


FIG. 6.



INVENTORS
Harry V. Mooney
William W. Hicks
BY White & Port
ATTORNEYS

Patented Sept. 11, 1928. 1,683,984

UNITED STATES PATENT OFFICE.

HARRY V. MOONEY, OF SEATTLE, WASHINGTON, AND WILLIAM WESLEY HICKS, OF SAN FRANCISCO, CALIFORNIA.

DRYING SYSTEM.

Application filed May 3, 1926. Serial No. 106,202.

This invention relates generally to systems for drying articles and particularly to apparatus intended to be used for drying laundry.

Drying systems have commonly employed a chamber within which articles to be dried were placed, in combination with means for passing dry or heated air through the chamber. A power driven fan or blower was usually resorted to in order to produce a forced or induced draft thru the clothes or other articles. In case the air was heated before being introduced, it was usually discharged after passing the length of the chamber. Thus means had to be provided for heating relatively large quantities of air from room temperature to the drying temperature desired.

It is an object of this invention to devise a drying system in which the drying air is reheated and recirculated a number of times before being discharged from the chamber.

It is a further object of this invention to employ a flue in conjunction with a source of heat for inducing a thermal circulation within the chamber of a drying system.

It is a further object of this invention to devise novel means in a system such as described for removing moisture ladened air from the system and for introducing fresh quantites of air.

It is a further object of this invention to incorporate an electric heater with a lundry drying system in such a manner that the current consumption will be maintained at a minimum.

It is a further object of this invention to devise a novel and efficient method of operating a laundry drying system.

Further objects of this invention will appear from the following description in which we have set forth the preferred embodiment of our invention. It is to be understood that the scope of the invention is to be determined from the appended claims and the state of the prior art.

Referring to the drawings:

Figure 1 is a vertical longitudinal cross sectional view showing a system constructed in accordance with this invention.

Fig. 2 is a cross sectional view taken along the line 2—2 of Fig. 1.

Fig. 3 is a vertical longitudinal cross sectional view showing a modification of this invention.

Figs. 4 and 5 are views similar to Figs. 1 and 2 showing another modification of the system.

Fig. 6 is a transverse cross sectional view showing a further modification of the invention.

The system comprises generally a chamber within which the clothes or other articles to be dried may be placed. Associated with the chamber there is an open ended flue which, in conjunction with a source of heat, is adapted to induce a thermal circulation of air within the chamber, thus passing the air repeatedly into contact with the clothes or other articles. Relatively small quantities of air are introduced and withdrawn from the system, so that the heat required for a given drying operation will be small compared to that required in prior systems. In introducing fresh quantities of air, means has been provided for first preheating the same and then intermixing it with the air being circulated within the chamber, the point of intermixing being selected so that it will produce maximum thermal efficiency of the system.

Referring first to the construction shown in Figs. 1 and 2, there is provided a chamber or compartment 10 which is of sufficient size to receive the articles or clothes to be dried. This compartment is provided with a sliding door 11 or other suitable means to provide access to the interior. Supported between the end walls 12 and 13 are a plurality of racks or rods 14 for hanging clothes or other articles. Associated with the drying chamber there is a source of heat which is preferably in the form of a plurality of electrical heating resistances 16, each comprising in the particular instance a hollow refractory core 17 having disposed upon its periphery the resistance conductors 18. The heating elements 16 are preferably mounted upon the bottom wall 19 of a shell 20, the shell being secured at its forward edge to the wall 12 of the chamber. Opening 21 in the wall 12 permits convection currents of air to pass into the shell 20 into contact with the heating elements 16, the air passing out again through the opening 22. The upper wall of the shell is preferably forwardly inclined to direct discharged air away from the wall 12. Thus it is seen that there is provided a flue for convection currents of air, the flue being as-

sociated with the heating elements 16 in such a manner that large volumes of air will be drawn upwardly thru the flue and discharged again into the interior of the chamber with considerable velocity. The air discharged from the opening 22 will take substantially the path indicated by the arrows in Fig. 1; that is, as the air leaves the opening 22 it will rise thru the clothes to be dried, will move across the chamber, then downwardly near the wall 13 and return again as cooled moisture ladened air into the opening 21. A thermal circulation of air is thus established in which heated air is continually repassed into contact with the clothes while the moisture ladened air is being reheated in passing thru the flue.

It is of course obvious that means must be provided for removing a certain quantity of moisture laden air and for introducing fresh quantities of air. In the construction shown in Figs. 1 and 2 there has been provided an outlet conduit 24 which is located near the lower portion of the chamber 10. A small motor fan 26 may be positioned within this conduit 24 for withdrawing air from the chamber. For introducing fresh air into the chamber and preheating the same there is provided a housing or shell 27 which is disposed about the shell 20 and spaced from the walls of the same, the housing 27 being similarly secured at its forward edges to the wall 12. The lower portion of the housing is apertured as at 28 to permit the entrance of fresh air at atmospheric pressure. The wall 12 is also cut away as at 29 so that the space between the shells 20 and 27 forms substantially a vertical open ended flue 30 for the passage of convection currents of air. Fresh air entering through the opening 28 will divide and pass in part up thru the flue 30 and in part through the hollow refractory core 17 to intermingle with the air being circulated within the chamber. Since the preheated fresh air is intermingled with the fresh air within the chamber at substantially the point where the air being recirculated within the chamber is at its highest temperature, there will therefore be substantially no heat exchange between the preheated fresh air and the air being circulated, thus insuring highest thermal efficiency for the system. The manner of introducing the fresh air thru one or more heated flues precludes the necessity for employing a fan or other mechanical means. As the air which is discharged fro mthe system is withdrawn from the lower portion of the container it will be discharged at a relatively low temperature and will be thoroughly saturated with moisture. Sufficient velocity will be imparted to the air being discharged from the openings 22 and 29 to produce a perceptible draft within the chamber, thus effectively bringing the air into contact with the clothes. In order to prevent the wall 12 from becoming heated to a dangerously high temperature a baffle 32 may be provided directly in front of the heating elements 16 and spaced from the wall 12 whereby convection currents may pass upwardly between the baffle 32 and the wall 12.

The modification shown in Fig. 3 differs from that shown in Figs. 1 and 2 in the particular means for withdrawing moisture laden air from the system. In this case the heating elements 16 are supported within a shell 36 which has its forward edges secured to the wall 12 of the drying chamber, and is mounted upon an apertured shelf 37. The lower portion of the shell 36 below the shelf 37 communicates with the atmosphere through the passageway 38 while the upper portion of the shell is provided with a forwardly curved portion 39 and communicates with the chamber thru the opening 40. An opening 41 is also provided for entrance of air from the chamber into the shell 36 whereby it is heated by the elements 16 and discharged from the opening 40 in the same manner as previously described. For the discharge of moisture laden air the shell 36 is inclosed by a housing 43 forming an open ended flue 44 for convection currents of air. The lower end of this flue communicates with the interior of the chamber thru the opening 45 while the upper end 46 discharges into the atmosphere. Heat will be imparted to the air in the flue 44 from the heated walls of the shell 36 and thus there will be produced an upward draft which will be sufficient to withdraw moisture laden air from the chamber. It is to be noted that both in the case of the arrangement shown in Figs. 1 and 2 and with that of Fig. 3 the moisture laden air is withdrawn in a direction tangential to the general circulatory movement of the air within the chamber whereby circulation within the chamber is facilitated.

In the modification shown in Figs. 4 and 5 the heating means has been located along the side of the drying chamber rather than upon one end of the same, as shown in the prior constructions. Also a different means has been provided for withdrawing the air from the system. Thus the heating elements 16 have been located behind the side wall 9 of the chamber 10 within a shell 50 which may extend substantially the entire length of the wall 9. Suitable openings 51 and 52 are provided in the side wall 9 to permit air from the chamber to pass into the shell 50 into contact with the heating elements and out again thru the openings 52. Inclosing the shell 50 and spaced from the walls thereof is a housing 53 which is in communication with the atmosphere by means of an opening 54 in its lower portion. The bottom

wall 55 of the shell 50 is suitably apertured to permit convection currents of air to pass upwardly thru the hollow heating cores 17, whereby air entering the opening 54 from the atmosphere branches and follows two paths, one thru the hollow cores 17 and the other thru the flue 56 formed by the space between the housing 53 and the shell 50. The upper end of the flue 56 is in communication with the interior of the chamber thru the opening 57. For withdrawing moisture ladened air from the system there is provided a header 58 disposed along the bottom of the chamber. A plurality of ports or openings 59 are distributed along the length of the header 58 and suitable means such as a motor fan 60 serves to withdraw air thru ports 59 and discharge the same thru the open end 61 of the header.

The apparatus shown in Fig. 6 is similar to that shown in Figs. 4 and 5, but differs in the structural details for the circulation and heating means. In this case the electrical heating means is in the form of a hot panel 63 which is mounted upon the upstanding wall 64. On either side of the wall 64 there are disposed baffle walls 65 and 66, the wall 66 being interposed between the wall 64 and the side wall 9 of the chamber. A further baffle wall 67 may be mounted in spaced relationship to the wall 64 whereby two flues 68 and 69 are formed for inducing a thermal circulation within the drying chamber, these flues being open at their upper and lower ends. For introducing fresh air into the system an opening 70 is provided in the side wall 9 whereby fresh air will be drawn into the interior of the chamber thru the suction induced by the two flues 71 and 72 which are formed between the hot panel 63 and the wall 9. Moisture ladened air is withdrawn from the system thru a header 58 of similar construction to that shown in Figs. 4 and 5. The upper edges of the walls 64, 65 and 66 may be curved inwardly as shown in order to direct the heated air away from the wall 9.

We claim:

1. A drying system comprising a chamber within which articles to be dried are adapted to be placed, a source of heat associated with said chamber, means forming a flue for convection currents of air associated with said source of heat, said flue communicating with said chamber at vertically spaced points whereby the air within the chamber is circulated into contact with the articles to be dried, an intake passage communicating with said flue near the lower end of the same for introducing fresh quantities of air into the system at atmospheric pressure, and a second flue in heat absorbing relationship with said source of heat, said second flue receiving air from the lower portion of the chamber and discharging the same from the system.

2. A drying system comprising a chamber within which articles to be dried are adapted to be placed, a source of heat associated with said chamber, means forming a flue for convection currents of air associated with said source of heat, said flue communicating with said chamber at vertically spaced points whereby air within the chamber circulates into contact with articles to be dried, means for introducing fresh quantities of air into the system, and a heated flue communicating at its lower end with said chamber for withdrawing air from the system.

3. In a drying apparatus, a drying chamber having an upstanding wall, a shell secured to said wall and disposed in the exterior of the chamber, electrical heating means in said shell, vertically spaced openings in said wall whereby air within the chamber may circulate into and out of said shell, and means forming a flue enclosing the exterior of said shell, the lower portion of said flue having communication with said chamber.

4. In a drying system comprising a chamber within which articles to be dried are adapted to be placed, a source of heat associated with said chamber, means for causing air within the chamber to be circulated into contact with said heating means, and a flue having a heat conducting wall in heat receiving relationship with said source of heat, said flue receiving air from the chamber and discharging the same from the chamber.

5. A drying system comprising a chamber within which articles to be dried are adapted to be placed, a source of heat associated with said chamber, means forming a flue for convection currents of air associated with said source of heat, said flue communicating with said chamber at vertically spaced points whereby air within the chamber circulates into contact with articles to be dried, means for introducing fresh quantities of air into the system, and a second flue in heat absorbing relationship with said source of heat, said second flue receiving air from the lower portion of the chamber and discharging the same from the system.

In testimony whereof we have hereunto set our hands.

HARRY V. MOONEY.
WILLIAM WESLEY HICKS.